PATIENT- AND FAMILY-RATED SCALE FOR BIPOLAR DISORDER SYMPTOMS: INTERNAL STATE SCALE

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The monitoring of patients, by themselves and their caregivers, is very important in the prophylaxis of bipolar disorder. This study aimed to develop a Chinese-language version of an instrument for assessment of manic and depressive symptoms by patients and their families. Fifty-eight inpatients and outpatients with a DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) diagnosis of bipolar disorder were recruited. All subjects underwent clinical psychopathologic assessment by experienced psychiatrists using the Young Mania Rating Scale (YMRS) and the Hamilton Depression Rating Scale (HDRS). At the same time, each patient and key family members filled out the Chinese-language version of the Internal State Scale (ISS) for monitoring mental symptoms. Patients were examined a second time if they had entered remission or a new episode of the opposite polarity. The ISS was divided into two subscales, of well-being/activation and of irritability. Patients' well-being/activation and irritability subscales were significantly correlated with YMRS scores and the well-being/activation subscale was also significantly correlated with the HDRS score. Family members' irritability subscales were significantly correlated with HDRS scores only. The reliability and constructive validity of the ISS was good in both patients with bipolar disorder and their families.

Key Words: bipolar disorder, psychopathology, self-rating scale
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When Emil Kraepelin distinguished patients with manic-depressive psychosis from those with dementia praecox in 1899 [1], bipolar disorder was characterized as a disease with little functional deterioration that tended to relapse. The course of recurrent bipolar disorders is now divided into bipolar I disorder, bipolar II disorder, cyclothymic disorder, and bipolar disorder not otherwise specified (longitudinal course, seasonal pattern, rapid cycling). Patients may have between two and 30 manic episodes during their lifetime (mean, 9 episodes). About 40% of all patients have more than 10 episodes, 45% have more than one episode, and 40% have a chronic disorder [2,3]. Scott proposed that an adult developing bipolar disorder in his or her mid-20s effectively loses 9 years of life, 12 years of normal health, and 14 years of working life [4]. Although drugs such as lithium provide effective prophylaxis [5], their efficacy appears to be less than expected. Solomon et al pointed out that more recent studies of prophylactic drugs report that about 50% of bipolar patients relapse within 2 years [6]. Several side effects

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of these drugs have decreased patient compliance and increased the load on caregivers, encouraging the use of alternative drug strategies and the development of psychotherapies specific to this disorder.

Descriptions of the core characteristics of bipolar disorder often emphasize the euphoric state that is the affective opposite of depression [1]. However, there is some evidence that euphoric mood is not the core manic symptom. Goodwin and Jamison indicate that depressive and irritable symptoms are more common than euphoric symptoms in the manic phase, occurring in 70–80% of patients [2]. We hypothesized that mania, depression, and irritability constitute the core characteristics of bipolar disorder.

The characteristic mood swings in patients with bipolar disorder impair social function, work performance, and even cognitive function [3,6]. Hence, monitoring patients' psychopathology, particularly in patient self-reports, plays an important role in the diagnosis and long-term follow-up of mood disorders [7]. Most tools used to assess the symptomatology of bipolar disorder are observer-rated, based on either a brief interview [8–10], extended patient observation [11,12], or both [13]. There are few tools, such as the Internal State Scale (ISS) [7] and the Self-Report Manic Inventory [14], for self-rating. In addition, caregivers play an important role in caring for patients with mental problems in Taiwan [15]. However, there is no rating scale for caregivers to help monitor symptomatology in bipolar patients.

Although the relative paucity of self-report manic scales may reflect an assumption that manic patients are unreliable due to their mood state, the ISS is a valid measure of the severity of manic/hypomanic symptoms and the sensitivity of the mood fluctuation. The ISS is easily used by subjects and requires 5–10 minutes to complete [7]. ISS is widely applicable in various conditions, such as when a trained rater is not available and mania is not present. It provides information on mood fluctuations and reduces the costs of regular evaluation. However, to maintain compliance, patients and their families need to be reminded regularly, during outpatient clinic visits, to fill out the form [16]. In our study, visiting durations were between 2 weeks and 1 month.

The goal of this study was to develop a Chinese-language rating tool for both patients and families. The scale would potentially offer subscales to reflect the presence and severity of manic and depressive symptoms. The scale would be a convenient and inexpensive way to monitor mood fluctuations or disease relapse. In addition, we hope the scale will provide a better strategy for long-term follow-up of patients with bipolar disorder.

Patients and Methods

Subjects

Patients were drawn from the inpatient and outpatient units of a university hospital in southern Taiwan. These patients met DSM-IV criteria for a current episode of major depression, mania, or hypomania. Before the assessment was performed, informed consent was obtained from the patients and their families. Fifty-eight patients with bipolar disorder (34.10 ± 16.30 years old; 28 males and 30 females), 74 healthy controls (19.25 ± 3.18 years old; 40 males and 34 females) from a high school, and 58 caregivers (18 males and 40 females) completed the ISS. Of the caregivers, 41.8% were the patients' parents, 28% were siblings, and 15% were the patients' partners or spouses; 57.8% of patients received at least high-school education, and only 25.9% of patients were married.

The definition of a key caregiver was someone who lived with the patient, was entitled to decide treatment mode and medication, and was responsible for the patient's daily care. Patients were excluded from the study if they had known substance intoxication or withdrawal, a history of organic brain syndromes, a neurologic disorder, or a history of treatment with electric convulsive therapy. All subjects gave informed consent.

Scales

The Chinese-language version of the ISS was translated from the original with the permission of Dr. Mark S. Bauer [7]. The translation was first done by a psychiatrist, and then back-translated for comparison. Five items were added to the original 16 items, yielding 21 in total. The ISS was originally designed for patient use as a means to sample self-perception (ISS-P). We developed a family version to include the key caregiver (ISS-F) and added five items to the 16 in order to develop a more ideal assessment tool, not only for the patient's self-rating but also for the key caregiver's rating. The 21 items were presented as a 100 mm visual analog-line format; the last item was a global index for

the current mood.

The Hamilton Depression Rating Scale (HDRS) is an itemized questionnaire providing information on the cognitive and somatic symptoms of depression, and is rated by psychiatrists [17]. The Hamilton Anxiety Rating Scale (HARS) is an itemized questionnaire providing information on the cognitive and somatic symptoms of anxiety, and is also rated by psychiatrists. The inter-rater reliability, *r*, of HARS is 0.88, and that of HDRS is 0.93. The Young Mania Rating Scale (YMRS) is also rated by psychiatrists [10].

Evaluation procedures

Patients filled out the ISS-P and within 24 hours underwent a clinical interview to establish the episode and clinical diagnosis. The interviewer was blinded to the ISS results. Symptom severity was assessed using HDRS and YMRS. The caregiver also filled out an ISS-F within 24 hours after the patient had been assessed. Patients were evaluated on an additional occasion if they were determined to have entered remission, which was defined as an HDRS score of less than 7, or if they had a YMRS score of less than 5 or had experienced another episode. Twelve of 58 patients and their key caregivers filled out an ISS every month for at least 6 months, at the outpatient clinic or at their homes. The *r* values of test-retest reliability 2 weeks later, using 20 patients and healthy controls recruited from the community, were 0.81 and 0.91, respectively.

Statistical analysis

All analyses were carried out using the SPSS statistical software package (SPSS, Inc., Chicago, IL, USA) for Windows. Statistical analysis included Chi-squared and independent *t*-tests. Principal component analysis and Oblimin with Kaiser normalization rotation were used for factor analysis. Statistically significant differences were shown among the groups at *p* values of less than 0.05.

Results

Principal component analysis identified three factors with Eigenvalues greater than 1.0 (Table 1). The nine items of factor 1 composed the activation subscale, the eight items of factor 2 composed the irritability subscale, and the three items of factor 3 composed the

Table 1. Factor loading from principal components analysis

Item	Factor 1	Factor 2	Factor 3
Today...			
I feel energized	0.817	0.250	0.397
I feel overactive	0.813	0.351	0.477
I feel like having new ideas and plans	0.793	0.430	0.450
I feel "sped up" inside	0.793	0.497	0.360
I feel like going on a buying spree	0.746	0.456	0.135
My thoughts are going fast	0.745	0.359	0.539
I feel argumentative	0.679	0.610	0.317
I feel less need for sleep	0.671	0.357	0.192
I feel talkative	0.670	0.409	0.196
I feel depressed	0.325	0.809	0.217
I feel impulsive	0.447	0.771	0.291
I feel restless	0.448	0.771	
I feel like the world is against me	0.499	0.763	
I feel irritable	0.399	0.763	0.337
I cannot concentrate	0.436	0.746	
My mood is changeable	0.444	0.690	0.248
It seems like nothing will ever work out for me	0.266	0.673	0.137
I feel like a capable person	0.605	0.332	0.803
I actually feel greater inside	0.522	0.441	0.763
I feel like people are out to get me	0.578	0.413	0.746
Initial Eigenvalues	8.944	2.331	1.053

Extraction method: principal component analysis. Rotation method: Oblimin with Kaiser normalization.

well-being subscale (Table 2). Since the three items of factor 3, i.e. "I feel like a capable person", "I feel like people are out to get me", and "I actually feel greater inside", were highly associated with the other items of factor 1, they were added together to comprise one symptom dimension, the well-being/activation index. The α coefficient for the reliability of internal consistency was 0.92 for the well-being/activation index and 0.89 for the irritability index.

The correlations among the subscales of the ISS and other rating scales related to mood swing monitoring are shown in Table 3. Patients' well-being/activation scores were significantly correlated with YMRS scores ($r = 0.57$, $p < 0.01$), but they were significantly negatively correlated with HDRS scores ($r = -0.30$, $p < 0.01$). Patients' irritability scores were significantly correlated with YMRS scores ($r = 0.26$, $p < 0.05$). Global index scores for current mood were significantly negatively associated with HDRS scores ($r = -0.30$, $p < 0.05$). Families' well-being/activation scores were not significantly correlated to YMRS or HDRS, but families' irritability scores were significantly correlated with HDRS scores ($r = 0.28$, $p < 0.05$). The single items of the ISS-F that were correlated to YMRS scores were "irritable" (item 2) ($r = 0.29$, $p < 0.05$), "out to get me" (item 4) ($r = 0.28$, $p < 0.05$), "less need of sleep" (item 16) ($r = 0.28$, $p < 0.05$), and "buying spree" (item 19) ($r = 0.28$, $p < 0.05$). The single items of the ISS-F that were correlated to HDRS score were "depressed" (item 7) ($r = 0.37$, $p < 0.01$), "sped up" (item 12) ($r = 0.32$, $p < 0.05$), "restless" (item 13) ($r = 0.39$, $p < 0.01$), and "being unable to concentrate" (item 20) ($r = 0.31$, $p < 0.05$).

Discussion

Although this scale was adapted from the original ISS, there were still some differences between the items on the two scales. In the current study, the items "I feel argumentative" and "I feel like people are out to get me" were no longer defined as part of the irritability index. This may be due to cultural differences in manic symptomatology and perception of the expression of items. The different demographic variables in the current study and the original ISS study need to be further explored.

The global index for mood was the last item on the scale, with a 100 mm visual analog-line record ranging

Table 2. Subscales after factor analysis on the Internal State Scale

Item no.	Symptom dimension	Loading
Well-being/activation index		
8	My thoughts are going fast (W)	0.745
10	I feel overactive (W)	0.813
12	I feel "sped up" inside (W)	0.793
14	I feel argumentative (W)	0.679
15	I feel energized (W)	0.817
16	I feel less need for sleep (W)	0.671
17	I feel like having new ideas and plans (W)	0.793
18	I feel talkative (W)	0.670
19	I feel like going on a buying spree (W)	0.746
3	I feel like a capable person (A)	0.803
4	I feel like people are out to get me (A)	0.746
5	I actually feel greater inside (A)	0.763
Irritability index		
1	I feel energized (I)	0.690
2	I feel irritable (I)	0.763
6	I feel impulsive (I)	0.771
7	I feel depressed (I)	0.809
9	It seems like nothing will ever work out for me (I)	0.673
11	I feel like the world is against me (I)	0.763
13	I feel restless (I)	0.771
20	I cannot concentrate (I)	0.746

A = activation; I = irritability; W = well-being.

Table 3. Correlation among different scales

	Well-being/ activation index*	Irritability index*	Global index of current mood*	HDRS	YMRS	Well-being/ activation index†	Irritability index†	Global index of current mood†
Well-being/ activation index*		0.658‡	0.455‡	–0.297§	0.571‡	0.475‡	0.450‡	0.328‡
Irritability index*	0.658‡		0.139	0.064	0.261§	0.330‡	0.509‡	0.203§
Global index of current mood*	0.455‡	0.139		–0.298§	0.214	0.343‡	0.187§	0.359‡
HDRS	–0.297§	0.064	–0.298§		–0.206	0.065	0.283§	–0.213
YMRS	0.571‡	0.261§	0.214	–0.206		0.236	0.194	0.172
Well-being/ activation index†	0.475‡	0.330‡	0.343‡	0.065	0.236		0.767‡	0.461‡
Irritability index†	0.450‡	0.509‡	0.187§	0.283§	0.194	0.767‡		0.322‡
Global index of current mood†	0.328‡	0.203§	0.359‡	–0.213	0.172	0.461‡	0.322‡	

Well-being/activation index includes items 3, 4, 5, 8, 10, 12, 14, 15, 16, 17, 18, 19. Irritability index includes items 1, 2, 6, 7, 9, 11, 13, 20. HDRS = Hamilton Depression Rating Scale; YMRS = Young Mania Rating Scale. *Patient; †caregiver. ‡$p = 0.01$ (2-tailed); §$p = 0.05$ (2-tailed).

from depression to elation, and was used for patients to self-monitor mood shifts. However, it failed to correlate with other indices, such as YMRS and HDRS scores, so was less useful in this study than it is in Western countries [7]. There are some differences between the Chinese-language version of the ISS and the original. The Chinese version had different subscales from the original but had higher correlations of symptom severity.

From the perspective of the significant correlations found among symptom severities, using an objective rating, the results of this study support the constructed validity of the ISS. However, since only a few cases demonstrated the predictive validity of the ISS, further extensive longitudinal exploration of mood shifts and predicted validity is required.

Our original intent was for the scale to be used not only by patients but also by their families. Although the original ISS was primarily designed to assess self-perception of internal moods rather than behavior patterns, we added some behavioral observation items to the family version. However, the family version still suffered from poor sensitivity and validity. Many factors may confound the sensitivity and validity in the family version. First, family members may have limited ability to observe symptoms and may record them in an inadequate range of items. Second, the construction of the rating scale in the family version may be completely different from that in the patient version. We need to further compare families after group education, and develop a validated version for the early detection of relapse. For caregivers, we suggest using this present version and emphasize that certain items correlate with the YMRS (items 2, 4, 16, and 19) and the HDRS (items 7, 12, 13, and 20).

The results of the present study need to be interpreted with caution. First, the study only included a small number of patients, so the multiple comparisons among different scales will increase type I errors. Second, a prospective study is needed to test the predictive validity of ISS in both versions. Third, the control group had different demographics (age and sex), which may influence the sensitivity of mood change and factor analysis of subscales and needs further study with a large-scale sample; the interpretation of the factor analysis needs to be cautious. Finally, further observation of possible symptomatology differences in bipolar disorder in Chinese is necessary.

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